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EXAMINER

KWOK, HELEN C

ART UNIT

PAPER NUMBER

2856

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/599,833 | <b>Applicant(s)</b><br>WATANABE ET AL. |  |
|                              | <b>Examiner</b><br>Helen C. Kwok     | <b>Art Unit</b><br>2856                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>October 1, 2007</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority based on applications filed in Japan on 2/23/05, 2/25/05, 3/9/05 and 12/27/05. It is noted, however, that applicant has not filed a certified copy of the Japanese applications as required by 35 U.S.C. 119(b).

### ***Specification***

2. The title of the invention is needs to be more descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4, 6, 8, 10-11 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 4, line 2, the phrase "the mounting surface" lacks antecedent basis.

In claim 6, line 2, the phrase "the mounting surface" lacks antecedent basis.

In claim 8, line 3, the phrase "the substrate-facing surface" lacks antecedent basis.

In claim 10, line 3, the phrase “the vibration elements” lacks antecedent basis. In line 4, the phrase “the vibrator portions” lacks antecedent basis. In line 4, the phrase “the vibration elements” lacks antecedent basis.

In claim 11, line 5, the phrase “the plurality of vibration elements” lacks antecedent basis.

In claim 15, line 3, the phrase “the circuit element” lacks antecedent basis.

### ***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1-2, 10-12, 20 and 24-25 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 6, 8 and 15-17 of U.S. Patent No. 7,400,078 (Takahashi et al.). Although the conflicting claims are not identical, they are not patentably distinct from each other because each of the claimed elements and features (i.e. a supporting substrate having a plurality of lands; a vibration element; a base portion; a vibrator portion; bumps corresponding to the lands; circuit element; light-shielding cover) in the Instant application are claimed in the copending Application of Takahashi et al. Therefore, the claims in the Instant application are not patentably distinct from the claims of the copending Application of Takahashi et al.

#### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-2, 12, 20 and 24-25 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 11-266135 (Haruta et al.).

With regards to claims 1-2, 12, 20 and 24-25, Haruta et al. discloses a piezoelectric oscillator comprising, as illustrated in Figures 1-8, a supporting substrate 1 having a plurality of lands 14; a vibration element 2 mounted on a surface of the supporting substrate wherein the vibration element includes a base portion (i.e. the left hand portion of the vibration element) provided with a plurality of terminals 21b,22a connected to the lands, a vibrator portion (i.e. the right hand portion of the vibration element) extending from a side of the base portion in a cantilever manner such that the vibration element is mounted on the supporting substrate by joining the terminals to the lands with metallic projections 31,32,33 disposed therebetween. Furthermore, Haruta et al. further discloses the metallic projections are gold bumps corresponding to one of the terminals; a light-shield cover 4 covering the vibration element; the vibration portion has a substrate-facing surface flush with a mounting surface of the base portion wherein the substrate-facing surface is provided with a first electrode layer 21, a piezoelectric layer and a second electrode 22. (See, sections [0017] to [0033] of the reference translation filed by Applicant on October 1, 2007).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-266135 (Haruta et al.) in view of JP 8-264540 (Tago).

With regards to claim 3, Haruta et al. does not disclose the gold bumps are multi-tiered bump components. Tago discloses a bump structure comprising, as illustrated in Figures 1-2, a bump structure 7 having tiered bump components 4,5. (See, Abstract). It would have been obvious to a person of ordinary skills in the art at the time of invention to have readily recognize the advantages and desirability of employing the bump structure as suggested by Tago in lieu of the bump structure of Haruta et al. to prevent stress concentration that could be easily been conceived by an artisan in the art.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-266135 (Haruta et al.) in view of U.S. Patent Publication 2001/0051396 (Iwahashi et al.).

With regards to claim 4, Haruta et al. does not disclose the mounting surface of the base portion is provided with a dummy bump. Iwahashi et al. discloses an

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electronic circuit device comprising, as illustrated in Figures 14A-15B, the concept of using dummy bumps 12 for bonding. (See, sections [0102] to [0126]). It would have been obvious to an artisan in the art at the time of invention to have readily recognize the advantages and desirability of using dummy bumps as suggested by Iwahashi et al. to the apparatus of Haruta et al. to provide mechanical strength for a controlled environment for the sensing element.

12. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-266135 (Haruta et al.) in view of U.S. Patent 6,631,642 (Oguchi et al.).

With regards to claims 8-9, Haruta et al. does not explicitly disclose the supporting substrate is provided with a recess and the height of the recess. Oguchi et al. discloses a force detecting sensor comprising, as illustrated in Figure 7, a supporting substrate 18 having a recess 18a for allowing vibration portion 10 to vibrate freely and to maintain a predetermined value against a damping effect of airflow. (See, column 1, line 49 to column 2, line 10). It would have been obvious to a person of ordinary skills in the art at the time of invention to have readily recognize the advantages and desirability of employing the substrate with a recess as taught by Oguchi et al. to the apparatus of Haruta et al. to avoid damping due to the airflow produced and to provide a displacement limit for the vibration portion to ensure a reliable operation.

13. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-266135 (Haruta et al.) in view of WO 98/41818 (Akashi et al.).



With regards to claims 10-11, Haruta et al. does not disclose a plurality of vibration elements being oriented in different axial directions from each other and IC components. Akashi et al. discloses gyro sensor comprising, as illustrated in Figure 11, a plurality of vibration elements 28,29 oriented in different direction from each other (i.e. y-direction and z-direction). It would have been obvious to an artisan in the art to have recognize the advantages and desirability of employing a plurality of vibration elements as suggested by Akashi et al. to apparatus of Haruta et al. to provide a system that is able to detect rotational rate in multiple directions within a single measurement system. At the same time, it is a well known concept and technology in the art to include IC components in the circuit element and to have arrange these IC components as specified in the claim is a mere design expedient of where one would like to mounted the IC components without departing from the scope of the invention.

14. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-266135 (Haruta et al.) in view of JP 2005-39435 (Isohata)

With regards to claims 13-16, Haruta et al. does not disclose a load buffering groove for the vibration element and the circuit element. Isohata discloses a piezoelectric oscillator comprising, as illustrated in Figures 1-2, a load buffering groove for the vibration element 2 and the circuit element 5. (See, Abstract). It would have been obvious to a person of ordinary skills in the art at the time of invention to have readily recognize the advantages and desirability of employing the load buffering groove as suggested by Isohata to the device of Haruta et al. to reduce stress and external

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interferences to the system. At the same time, to have the load buffering groove have a depth of 100  $\mu\text{m}$  or more, as presently claimed, would have been a mere design expedient obvious to an artisan in the art to have set such test characteristics due to experimentation without departing from the scope of the invention.

15. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 11-266135 (Haruta et al.) in view of JP 10-051263 (Wakao et al.).

With regards to claims 21, Haruta et al. does not disclose a load buffering layer disposed between the external connection terminals and the control substrate. Wakao discloses a crystal vibrator comprising, as illustrated in Figures 16-19, an external connection terminal and a control substrate having a buffering layer disposed therebetween. (See, sections [0054] to [0058]). It would have been obvious to an artisan in the art to have readily recognize the advantages and desirability of employing the load buffering layer as suggested by Wakao to the apparatus of Haruta et al. to provide an adequate portion for stress relaxation between these components.

16. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haruta et al. as applied to claim 21 above, and further in view of JP 8-078954 (Ise).

With regards to claim 22, Haruta et al. does not disclose the load buffering layer includes an anisotropic conductive film. Ise discloses an oscillator comprising, as illustrated in Figures 1-2, an anisotropic conductive film. (See, section [0244]). It would have been obvious to a person of ordinary skills in the art to have readily recognize the

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advantages and desirability of employing an anisotropic conductive film as suggested by Ise to the apparatus of Haruta et al. to provide electrically connection from the external circuit to the external connection terminals.

17. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haruta et al. as applied to claim 21 above, and further in view of JP 7-201650 (Minami).

With regards to claim 23, Haruta et al. does not disclose a flexible wiring substrate. Minami discloses a surface mounting electronic device comprising, as illustrated in Figures 1-4, a flexible wiring substrate 2. (See, Abstract). It would have been obvious to a person of ordinary skills in the art to have readily recognize the advantages and desirability of employing the flexible wiring substrate as taught by Minami to the apparatus of Haruta et al. to protect the vibrator element against stress and other external interferences.

#### ***Allowable Subject Matter***

18. Claims 5-7 and 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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The references cited are related to vibratory gyroscope mounted to a substrate.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen C. Kwok whose telephone number is (571) 272-2197. The examiner can normally be reached on 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron E. Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Helen C. Kwok/  
Primary Examiner, Art Unit 2856  
March 9, 2009